Influenza A(H1N1) aka Swine Flu

IAP ACVIP statement on ongoing outbreak of H1N1 in India

Situational analysis:

Historical perspectives

H1N1 pandemic in 2009-10: The pandemic of A (H1N1) was first reported in India in 2009. It had several characteristics that differentiated it from seasonal flu. Globally, the illness rates were highest in children and young adults (20-40% of the population), the hospitalization rates were highest in children below one year of age, and the 'case fatality rates' (CFR) varied tremendously and were estimated to be between 0.0004- 1.5%. The risk factors for severe disease and death were pregnancy, morbid obesity, asthma, children below 2; however 25% -30% of those who died had no underlying risk factor. During the 2009 pandemic, pregnant women were documented as an important risk group for severe disease across the globe.

According to the Government of India data, 22.8% of the samples out of the total samples from 202,790 persons who had been tested have been found positive for A (H1N1). In the majority, the illness was self-limited with recovery within a week. Among those tested 94 % cases recovered and 2,728 deaths were reported till December 2010. Maximum cases were reported during the months of August and September. Though the attack rate was highest in the age groups of 20-39 years and 10-19 years, the highest case-fatality was seen in the age group 20-39, followed by in the young children less than 5 years old. According to a study (2007-2010) conducted in and around Delhi (India), the percent positivity of Influenza A(H1N1)pdm09 influenza virus was highest in >5–18 years age groups when compared to seasonal influenza.

A (H1N1) influenza outbreaks during 2011in India: In 2011 due to large epidemic in 2009-10 with resultant immunity, the circulation of H1N1 slowed down and only 603 cases with 75 deaths were reported.

A (H1N1) influenza outbreaks during 2012-13 in India: The pandemic virus continued to circulate and caused waves of infections leading to hospitalization and complications in different parts of India despite the fact that the pandemic stage of the H1N1 virus had ended in August 2010. Once a

pandemic has occurred, it is expected to have sporadic outbreaks of smaller magnitude in subsequent few years. In 2012, there were 5,044 reported cases of swine flu, which claimed the lives of 405 people. Northern India had an unusual heightened activity of A (H1N1) influenza in first quarter of 2013 that led to 261 deaths till February 28th 2013. However, in 2013, there were total 5,253 cases and 699 deaths in the entire year.

A (H1N1) influenza in 2014 in India: Last year (in 2014), the H1N1 circulation remains low and only 937 cases were reported in the country leading to 238 deaths (Table I).

Current situation

A (H1N1) influenza in 2015 in India: As per the data from Ministry of Health and Family Welfare, Government of India during the period 1 Jan 2015-10 February 2015, the total number of H1N1 cases is 5157 and number of deaths is 407. Largely the cases are from Delhi, Gujarat, Rajasthan, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu and Telangana whereas largely the deaths due to H1N1 are in Maharashtra, Madhya Pradesh, Gujarat, Rajasthan and Telangana.

As far as state-wise data is concerned, till Feb 2, 2015, Telangana state (629 cases with 34 deaths) reported the highest number followed by Delhi (488 cases, 5 deaths),Gujarat (309 cased with 38 deaths), Rajasthan (205 cases, 49 deaths), and Maharashtra (73 cases, 22 deaths). So this year, the disease is following the pattern of 2012-13. Mortality figures are significantly higher for Maharashtra, Rajasthan and Gujarat.

Table I. Cases and deaths caused by Influenza A H1N1 (Swine Flu) Year-wise, 2009-15.

Time	May 2009-	Jan 2010-	Jan 2011-	Jan 2012-	Jan 2013-	Jan 2014-	Jan 2015-
period	Dec 2009	Dec 2010	Dec 2011	Dec 2012	Dec 2013	Dec 2014	Feb 2015*
Cases	27236	20604	603	5044	5253	937	5157
Mortality	3.60%	8.55%	12.44%	8.03%	13.31%	25.40%	7.89%
Mortality ratio	3.60%	8.55%	12.44%	8.03%	13.31%	25.40%	7.89%

** Data till February 10, 2015*

(Source: Office of the Director, Emergency Medical Relief, Directorate General of Health Services, Government of India, New Delhi.)

'Seasonal' versus 'pandemic flu'

'Seasonal flu' usually has severe disease in children below 2 years, individuals above 65 years, and

in persons with chronic medical conditions whereas 'pandemic flu' more severely affected children and caused deaths in young adults having no risk factors. Sparing of elderly and very rapid transmissibility and high attack rates were other differentiating features. Overall, the severity and mortality of 'pandemic flu' was higher than seasonal flu (CFR of 0.89% vs 0.13%) in 2009-10.

A H1N1 usually have very rapid transmissibility and high attack rates and the severity and mortality of 'A H1N1 is higher than seasonal flu. This may be due to a strain against which not significant neutralizing antibodies exist.

Circulating strain of current A (H1N1) outbreaks in India

The data analyzed till September 2014, the majority of circulating isolates/strain India was similar to original an A/California/7/2009 (H1N1)pdm09-like virus with majority falling between clades 6 & 7. However, the strains circulating since then (i.e. from September onward) shall be analyzed and reported only in upcoming Feb 22-23 meeting of WHO (Figures I-III). Chances are the virus has not drifted much and even the Sept 2014 recommendation was to use the same strain in vaccines used earlier, i.e. A/California/7/2009 (H1N1)pdm09-like virus. But we do not know if there is some significant genetic mutation/drift took place since then. Further, the A (H1N1) predominates since week 53 of last year only. It is difficult to predict the future circulation of different types/subtypes of influenza viruses in the country. Furthermore, the yearly type/subtype distribution varied significantly from region to region, and from site to site.

Role of vaccines

Influenza vaccines

Most of the current seasonal influenza vaccines include 2 influenza A strains and 1 influenza B strain. Globally, trivalent inactivated vaccines (TIV) and live attenuated influenza vaccines (LAIV) are available. Only one brand of LAIV, Nasovac-S (Serum Institute of India) is available in India. However, It cannot be prescribed to children <2 years of age, high risk individuals and pregnant women.

Trivalent influenza vaccines are the only influenza vaccines licensed for vaccination of children <2 years of age, persons aged ≥50 years, and for pregnant women. Current trivalent influenza vaccines are not licensed for children <6 months of age.

Which vaccine to use?

All currently available trivalent vaccines now have the influenza strain that is antigenically similar to 2009 pandemic swine flu strain i.e. A(H1N1)pdm09. Hence, there is no need to go for separate 'swine flu' vaccine. For healthy individuals 2-49 years of age, LAIV provides broader and higher levels of protection than trivalent inactivated vaccines.

Dosage schedule

i. TIV/IIV: Trivalent/Inactivated influenza vaccine is administered intramuscularly, injected into the deltoid muscle (for vaccinees aged >1 year) or the antero-lateral aspect of the thigh (for vaccinees aged 6–12 months). Children aged 6–35 months should receive a pediatric dose, and previously unvaccinated children aged <9 years should receive 2 injections administered at least 4 weeks apart. A single dose of the vaccine is appropriate for school children aged ≥9 years and healthy adults.
ii. LAIV: Live attenuated vaccine is given as nasal spray, 1 dose only, but children aged 2–8 years who have not received seasonal influenza vaccine during the previous influenza season should receive 2 doses, at least 4 weeks apart. Annual vaccination (or re-vaccination, if the vaccine strains are identical) is recommended, particularly for high-risk groups.

Are the available vaccines effective against current outbreaks of H1N1?

All the available TIVs and LAIV have 'A/California/7/2009 (H1N1)pdm09-like virus' strain which as described above is the main circulating strain responsible for 'swine flu' as per the data available till September 2014. Whether any significant 'drift' had occurred since then would only be known by the end of this month, i.e. February 2015. So, if we assume that the virus has not drifted much since September 2014, the available vaccine should provide reasonable protection.

However, this is not true for other two strains. The A (H3N2) had drifted significantly and there is lot of variation in the B strain contained in the available vaccine and circulating strain. Hence, current vaccines will not be much effective against A-H3N2 and B strains.

IAP ACVIP recommendations:

Considering the fact that the available influenza vaccines are going to have much better effectiveness against the circulating A(H1N1)pdm09 strain than other influenza viruses owing to more ‘complete match’ between the strain circulating in the community and the strain contained in the vaccines, IAP ACVIP reiterates its earlier recommendation of using the influenza vaccine in all children with risk factors and also wherein the vaccine is desired/requested by the parents. Even pediatricians examining suspected cases of A (H1N1) are advised for vaccination against A (H1N1) influenza.

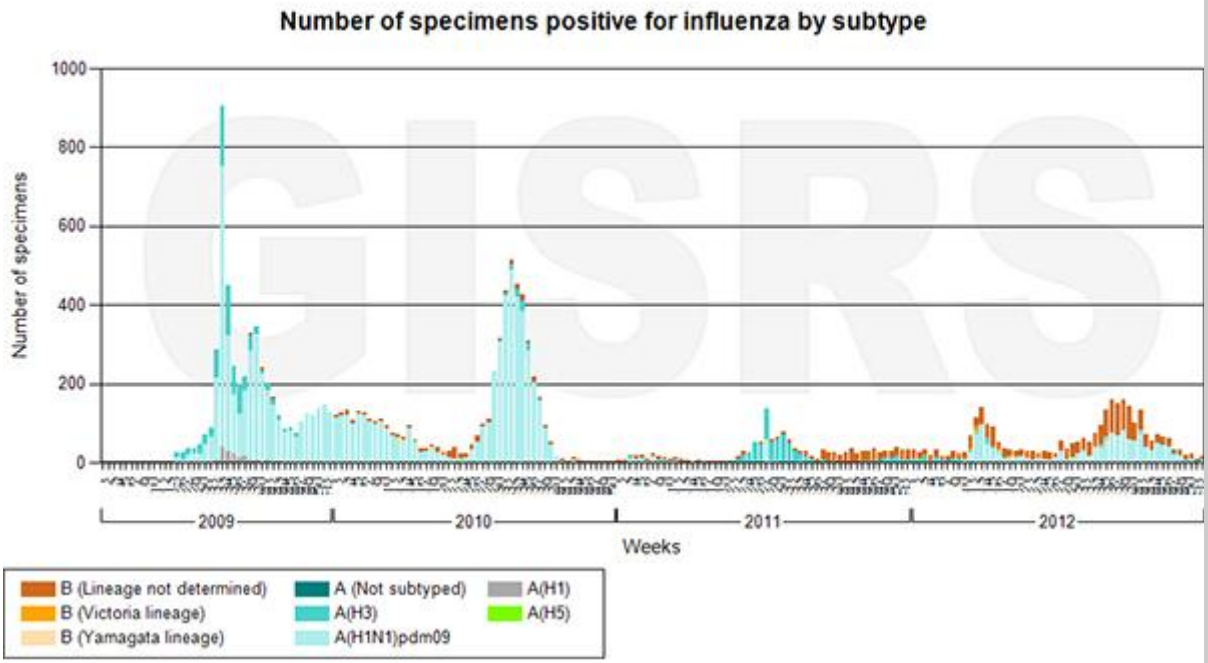
In the end, IAP advises its membership that there is no need to get unduly worried about the recent spurts in the activity of influenza A (H1N1) virus in few states. Though it is expected to have A (H1N1) infections slightly more severe with higher mortality than seasonal influenza caused by other co-circulating strains; the majority of cases are mild and self-limiting.

Sources:

1-Ministry of Health & Family Welfare, Government of India. Influenza, A H1N1.
2- Global Influenza Surveillance and Response System (GISRS).
3- Vaccines against influenza. WHO position paper-November 2012. Wkly Epidemiol Rec 2012; 87:

461–476.
4- Influenza Vaccination in India: Position Paper of Indian Academy of Pediatrics, 2013. Indian Pediatr 2013; 50: 867-74.

Fig I. Influenza surveillance, India 2009-12.



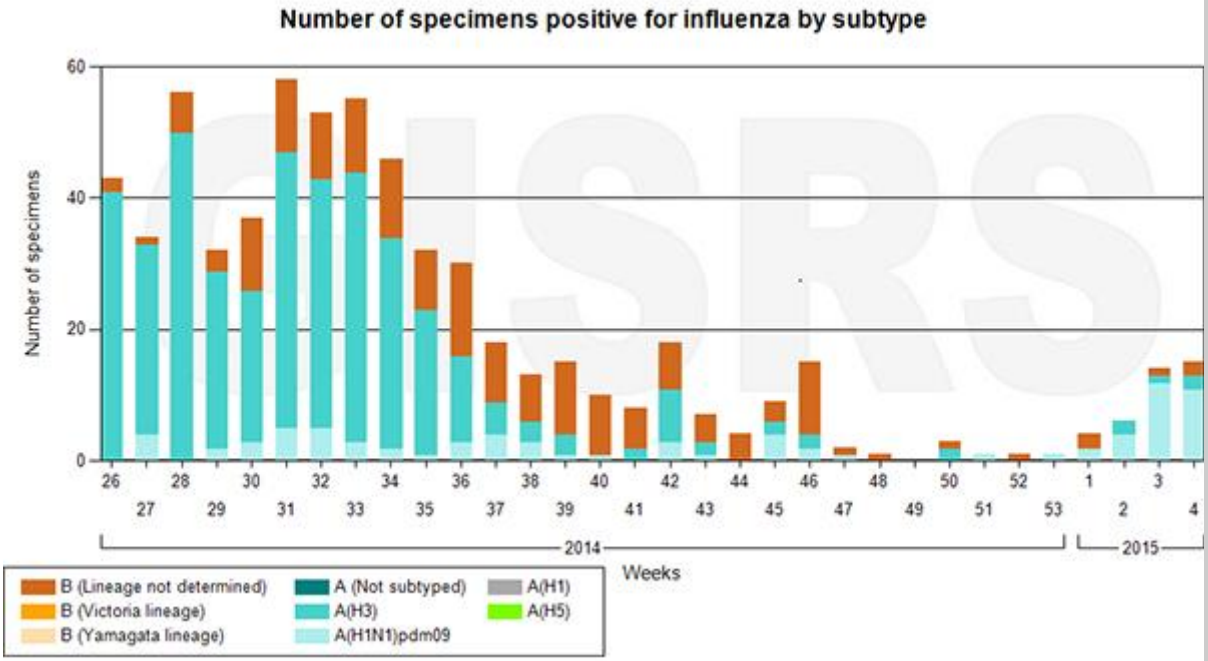


Fig. II. Influenza surveillance, India 2013-15 (till week 4).

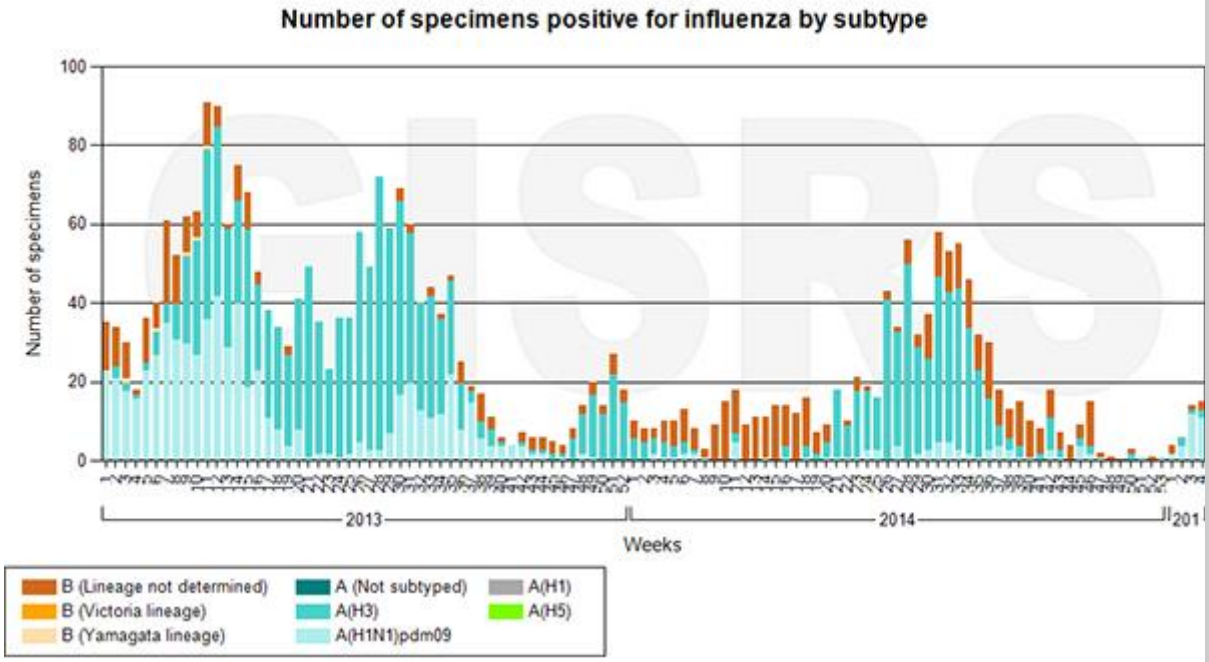


Fig. III. Influenza surveillance, India last 7-8 months (from week 26, 2014 to week4, 2015).

(Source: Influenza Laboratory Surveillance Information generated on 09/02/2015 05:06:18 UTC by the Global Influenza Surveillance and Response System (GISRS), India.)